

# **EXHIBIT T**

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25 UNITED STATES DISTRICT COURT  
26 NORTHERN DISTRICT OF CALIFORNIA  
27 SAN FRANCISCO DIVISION”

28 GOOGLE LLC,

Plaintiff and Counter-defendant,

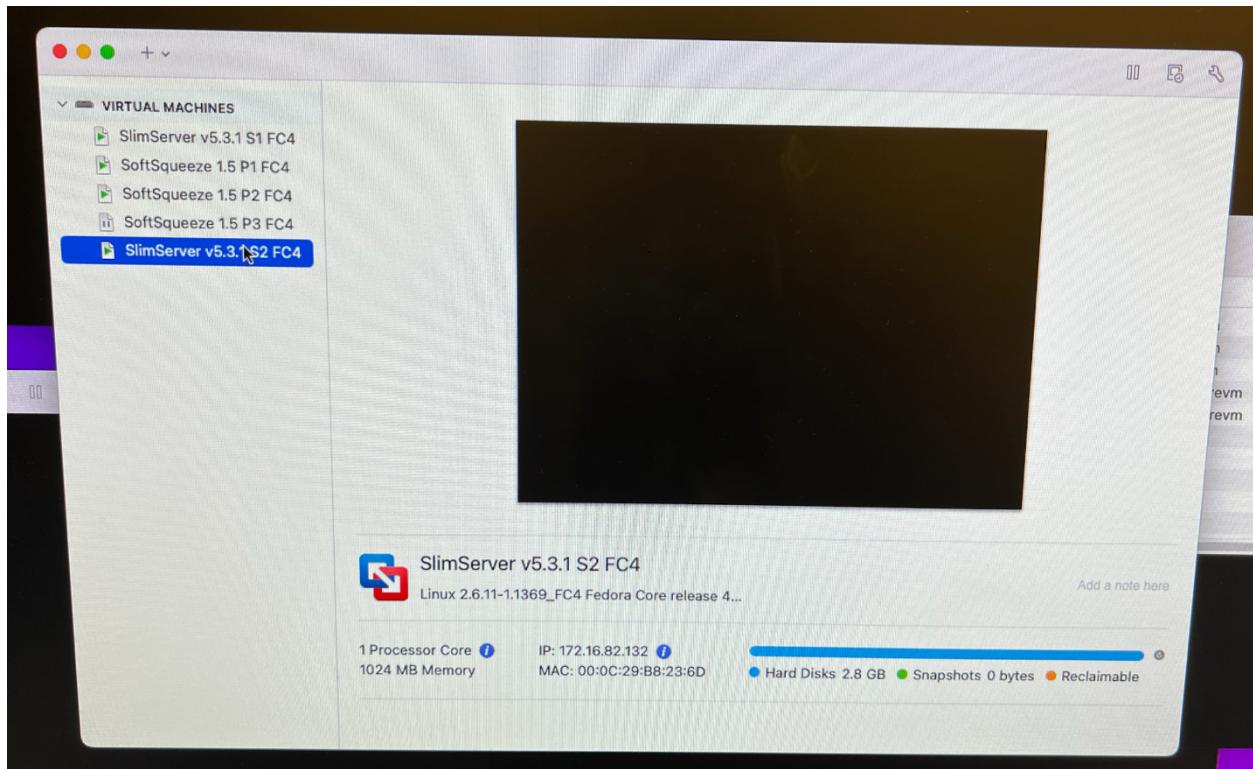
v.

SONOS, INC.,

Defendant and Counter-claimant.

Case No. 3:20-cv-06754-WHA  
Related to Case No. 3:21-cv-07559-WHA

**REBUTTAL EXPERT REPORT OF  
DR. KEVIN C. ALMEROOTH**



333. With respect to the Linux-based system configuration that Dr. Schonfeld actually appears to have tested, as I explained in my '885 Rebuttal Report, Dr. Schonfeld failed to establish that such a system configuration was ever implemented prior to any of the September 12, 2005 critical date, the December 21, 2005 invention date, or the September 12, 2006 priority date of the '885 and '966 Patents. For example, Dr. Schonfeld failed to establish that a system having three instances of the same Softsqueeze software player was ever implemented on the same computer. I find it highly improbable that a user would want to listen to audio playing from three Softsqueeze software players at the same time on the same computer. In fact, it is unlikely that a user would even want or need three Softsqueeze software players on the same computer. As another example, Dr. Schonfeld failed to establish that a system having two instances of the same SlimServer version 5.3.1 was ever implemented, let alone a system having two instances of the same SlimServer version 5.3.1 on the same computer. This seems unlikely since a Softsqueeze software player can only connect to one SlimServer instance at any given time, as shown in Dr. Schonfeld's testing and as explained below.

334. In response to my prior observation that Dr. Schonfeld failed to establish that a

1 system having two instances of the same SlimServer version 5.3.1 was ever implemented, Dr.  
2 Schonfeld asserts that “at least one tester showed[] [that] there was a need to use multiple servers  
3 and those servers worked.” See Schonfeld Op. Report at ¶ 192 (citing  
4 <https://www.digitaltrends.com/home-theater/slim-devices-squeezebox-review/>). I have reviewed  
5 the Digital Trends article that Dr. Schonfeld cited and nowhere does it state anything about  
6 SlimServer version 5.3.1. In fact, the article is dated December 9, 2003, which is almost a year  
7 before the alleged October 1, 2004 last modified date of the SlimServer version 5.3.1 that Dr.  
8 Schonfeld relies on. Moreover, unlike Dr. Schonfeld’s test system, which included two instances  
9 of the same SlimServer version 5.3.1 on the *same* computer, the “two servers” referred to in the  
10 Digital Trends article appear to have been running on two *different* machines (one on a “wired  
11 network” and another on a “802.11g wireless” network).

12 335. Further, as noted above, Dr. Schonfeld’s “Squeezebox” invalidity theories for  
13 Asserted Claim 1 of the ‘885 Patent are based on physical Squeezebox players, not Softsqueeze  
14 software players. To account for this flaw in his analysis, Dr. Schonfeld asserts that the  
15 Softsqueeze software players have “the same features and functionality” as the physical  
16 Squeezebox players. See Schonfeld Op. Report at ¶ 526, n.11. However, Dr. Schonfeld has not  
17 cited any evidence that this is true with respect to all of the Squeezebox player functionality that  
18 he describes and relies on in his Opening Report. Instead, Dr. Schonfeld attempts to support his  
19 assertion by merely stating that while this Linux-based testing “uses VMs and Softsqueeze, … my  
20 testing of the hardware Squeezebox confirms that the same setup is available through  
21 Squeezeboxes ....” *Id.* at ¶ 594. I disagree.

22 336. First, Dr. Schonfeld did not test the same functionality using the physical  
23 Squeezebox players as he did for the Softsqueeze software players. Compare Schonfeld Op.  
24 Report at ¶¶ 522-532 *with id.* at ¶¶ 594-739. For example, Dr. Schonfeld did not test the creation  
25 of two overlapping “sync groups” using physical Squeezebox players.

26 337. Second, Dr. Schonfeld did not use the same configuration for his testing using the  
27 physical Squeezebox players as he did for the Softsqueeze software players. For example, unlike  
28 his Linux-based testing of the Softsqueeze software players, Dr. Schonfeld’s Windows-based

1 testing of the physical Squeezebox players did not involve two separate SlimServers.

2       338. Third, it is my understanding that, while the physical Squeezebox players were  
3 made by Slim Devices, the Softsqueeze software player is a different product developed by an  
4 individual named Richard Titmuss. See SONOS-SVG2-00226947  
5 (<http://softsqueeze.sourceforge.net/index.html>). And Dr. Schonfeld did not do any comparative  
6 testing or analysis to determine that these two different types of players are functionally the same.  
7 For example, Dr. Schonfeld did not evaluate the source code for either of these players.

8       339. In view of these differences, I fail to see how Dr. Schonfeld can conclude that the  
9 Softsqueeze software players have “the same features and functionality” as the physical  
10 Squeezebox players, especially with respect to all of the functionality that he describes and relies  
11 on in his Opening Report.

12       340. Dr. Schonfeld’s reliance on the Softsqueeze software players suffers from other  
13 flaws as well, including that (i) Dr. Schonfeld fails to explain or establish how such software-based  
14 Softsqueeze players could possibly amount to the physical “zone players” required by Asserted  
15 Claims of the ’885 and ’966 Patents and (ii) Dr. Schonfeld does not make any allegations regarding  
16 the prior-art status of the software-based Softsqueeze players.

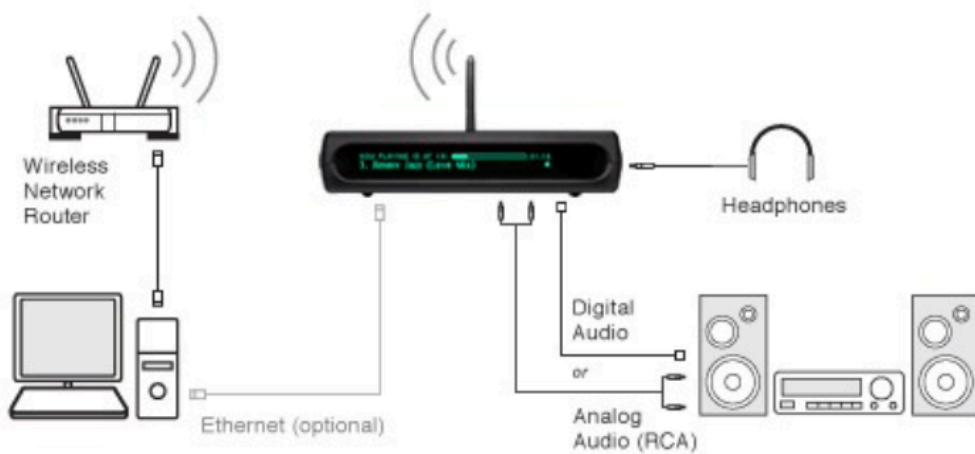
17           **3. Overview of a “Squeezebox” System**

18       341. My understanding of the functionality of Dr. Schonfeld’s “Squeezebox” reference  
19 is based my review of various evidence related to Squeezebox, including the documentation,  
20 source code, and physical products discussed in Dr. Schonfeld’s Opening Report.

21       342. Dr. Schonfeld’s “Squeezebox” reference was a server-based system comprising a  
22 computer installed with SlimServer software (which I will at times refer to herein as a  
23 “SlimServer” for simplicity) and one or both of hardware-based Squeezebox devices and/or  
24 software-based SoftSqueeze players (which I will at times refer to herein collectively as  
25 “Squeezebox players” for simplicity). See, e.g., GOOG-SONOS-NDCA-00108095-588 at  
26 GOOG-SONOS-NDCA-00108155-79, GOOG-SONOS-NDCA-00108192-94. The Squeezebox  
27 players were powered by the SlimServer software, and the SoftSqueeze players could not be used  
28 for audio playback without this SlimServer software. *Id.* In my discussion below, I will at times

1 refer to a system comprising a computer installed with the SlimServer software and one or more  
2 of the Squeezebox players identified by Dr. Schonfeld as a “Squeezebox system.”

3 343. The below image illustrates one example a Squeezebox system:



12 GOOG-SONOS-NDCA-00108095-588 at GOOG-SONOS-NDCA-00108155. In this example,  
13 the SlimServer software would be installed on the computer on the bottom left of the image, and  
14 would be connected to the Squeezebox player shown in the top center of the image.

15 344. The Squeezebox evidence I have reviewed indicates that at some point in time it  
16 may have been possible for a user of a Squeezebox system to create something called a “sync  
17 group,” which was a configuration in which the SlimServer software would attempt to cause  
18 multiple Squeezebox players to play the same music simultaneously. *See, e.g.,*  
19 Slim/Buttons/Synchronize.pm<sup>13</sup>; Slim/Player/Sync.pm; Slim/Utils/Prefs.pm;  
20 Slim/Player/Source.pm; Slim/Server/Squeezebox.pm; Slim/Player/Client.pm; GOOG-SONOS-  
21 NDCA-00108095-588 at GOOG-SONOS-NDCA-00108162, GOOG-SONOS-NDCA-00108169,  
22 GOOG-SONOS-NDCA-00108181. It appears that a user could create such a “sync group” in a  
23 few different ways.

24 345. For instance, the Squeezebox evidence I have reviewed indicates that at some point

26 <sup>13</sup> Unless otherwise noted, all citations to SlimServer source code in this report refer to the source  
27 code for SlimServer version 5.3.1 for Windows, which I downloaded from the following link  
28 identified in Dr. Schonfeld’s report: [https://downloads.slimdevices.com/SlimServer\\_v5.3.1/](https://downloads.slimdevices.com/SlimServer_v5.3.1/), and  
can be found within the “server” directory.

1 in time it may have been possible for a user of a Squeezebox system to create a “sync group” by  
2 accessing a web-based user interface (UI) for the SlimServer software, navigating to the “Player  
3 Settings” page for a first Squeezebox player, selecting a second Squeezebox player from the  
4 “Synchronize” drop-down list, and then pressing the “Change” button in order to create a new  
5 “sync group” comprising the first and second Squeezebox players. *See, e.g.*, Schonfeld Op. Report  
6 at ¶ 524.

7 346. The Squeezebox evidence I have reviewed indicates that at some point in time it  
8 may have also been possible for a user of a Squeezebox system to create a “sync group” using an  
9 infrared remote control for a hardware-based Squeezebox device, as described in the following  
10 “Frequently Asked Question” from the Slim Devices website:

11 **How do I synchronize two Squeezeboxes so they play the same audio?**

12 Navigate into the Player Settings area with the remote control. Choose Synchronize, then select  
13 the other player you want to synchronize with and press the RIGHT button. Both will play the  
14 same thing and you can control their synchronized playback from either remote. Go back to the  
same place and press RIGHT again to unsync.

15 You can also set up synchronization from the Player Settings page in the web interface.

16 GOOG-SONOS-NDCA-00108095-588 at GOOG-SONOS-NDCA-00108169.

17 347. When a user created a “sync group” in one of the ways described above, the  
18 Squeezebox evidence I have reviewed indicates that this would cause the SlimServer software to  
19 (i) store information about the newly-created “sync group” in a file on the computer running the  
20 SlimServer software and (ii) configure itself to control the audio buffer and playback on the  
21 Squeezebox players in the “sync group” in an effort to cause those Squeezebox players to play  
22 back the same music simultaneously. *See, e.g.*,  
23 Slim/Buttons/Synchronize.pm:functions():rightline; Slim/Player/Sync.pm:sync(),  
Sync.pm:unsync(), Sync.pm:saveSyncPrefs(); Slim/Utils/Prefs.pm; Slim/Player/Source.pm;  
Slim/Server/Squeezebox.pm; Slim/Player/Client.pm; GOOG-SONOS-NDCA-00108095-588 at  
GOOG-SONOS-NDCA-00108162, GOOG-SONOS-NDCA-00108169-70, GOOG-SONOS-  
NDCA-00108181 (stating that “[t]he Slimserver controls the audio buffer and playback on all the  
players that are synchronized together”).

1           D.     **Bose Lifestyle 50 System**

2           1.     **Introduction of Dr. Schonfeld's "Bose Lifestyle" Reference**

3       348. In his Opening Report, Dr. Schonfeld relies on an alleged prior art system called  
4       the "Bose Lifestyle 50 System," which Dr. Schonfeld refers to as "Bose Lifestyle" for short. *See*  
5       Schonfeld Op. Report at ¶855.

6       349. Although unclear, Dr. Schonfeld appears to be asserting that the Bose Lifestyle 50  
7       System is system prior art that "was publicly available, on sale, offered for sale, and described in  
8       printed publications both before the critical date (i.e., prior to September 12, 2005), before the  
9       alleged conception date (i.e., prior to December 21, 2005), and prior to the patent filing date on  
10      September 12, 2006." *Id.* Despite appearing to rely on the Bose Lifestyle 50 System as system  
11      prior art, Dr. Schonfeld does not provide any analysis or testing of an actual Bose Lifestyle 50  
12      System.

13       350. In asserting that the Bose Lifestyle 50 System invalidates claim 1 of the of the '885  
14      Patent, Dr. Schonfeld relies on various disclosures related to different Bose products, some of  
15      which have no relation to and are incompatible with the actual Bose Lifestyle 50 System. These  
16      various Bose products include:

- 17           •     Bose Lifestyle 50 System;
- 18           •     Bose Lifestyle SA-2 and SA-3 Amplifiers and their ability to be added to a Bose  
19       link media center of a Bose Lifestyle® 18 series II, 28 series II, 38 or 48 home entertainment  
20       system;
- 21           •     Bose link communication protocol; and
- 22           •     Bose FreeSpace EF Series II Business Music System.

23       Below I provide a summary of each of these Bose products.

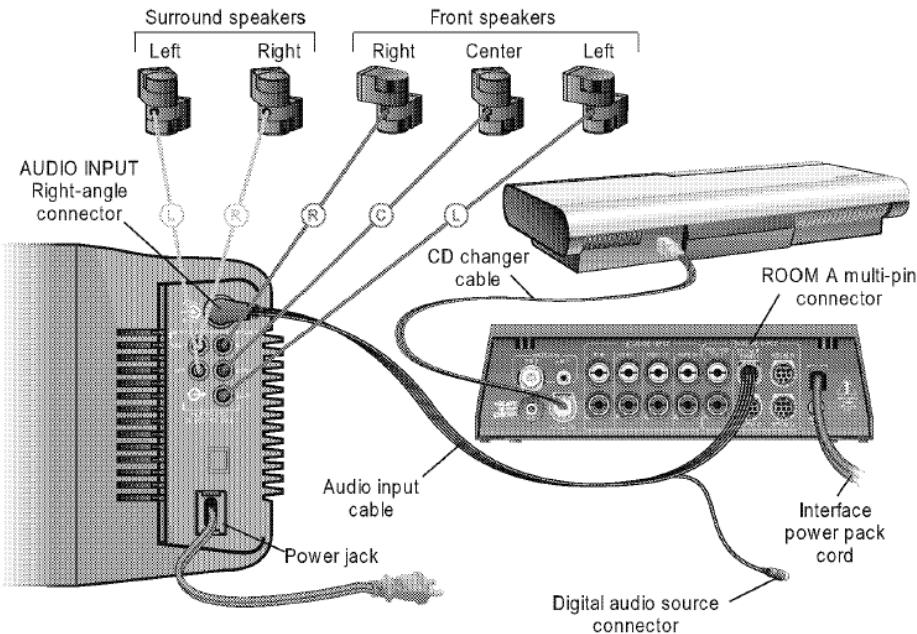
24           i.     **Overview of the Bose Lifestyle 50 System**

25       351. As described in the "Bose Lifestyle 50 System Owner's Guide" (referred to herein  
26       as "Bose Lifestyle 50 Guide"), dated October 17, 2001, the Bose Lifestyle 50 System includes a  
27       "multi-room interface," one or more "Acoustimass modules" (or other Bose powered speakers)  
28       that are each wired to the Multi-Room Interface via respective "audio input cables," and "Jewel

1 Cube speakers" that are wired to the "Acoustimass module" via "speaker cables." See  
2 BOSE\_SUB-0000001-55 at 7, 11-12. An example Bose Lifestyle 50 System configuration with a  
3 single Acoustimass module is shown in the figure below:

4  
5 **Figure 8**

6 Speakers, CD changer, and  
7 multi-room interface connec-  
8 tions



9  
10  
11  
12  
13  
14  
15 BOSE\_SUB-0000001-55 at 12.

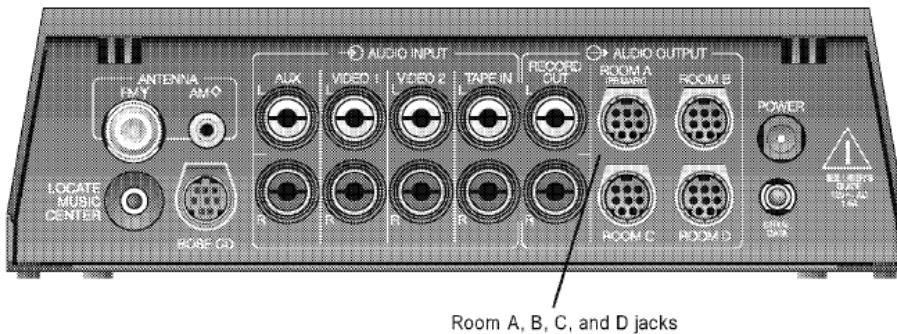
16  
17 352. The Bose Lifestyle 50 Guide also discloses that the centralized Multi-Room  
18 Interface includes various audio inputs to connect various audio sources (e.g., FM, AM, CD, DVD,  
19 VCR, etc.). *See, e.g.*, BOSE\_SUB-0000001-55 at 14-15; *see also id.* at 10 ("Place the multi-room  
20 interface close enough to the sound sources (TV, VCR, DVD, etc.) to allow for cable length."). In  
21 this respect, the "multi-room interface" of the Bose Lifestyle 50 System provides audio sources  
22 "locally" or from a "centralized location," similar to the conventional audio systems disclosed in  
23 the Background of the '966 Patent. *See, e.g.*, '966 Patent at 1:46-58.

24  
25 353. The "multi-room interface" also comprises four different audio output connectors  
26 labeled ROOM A-D to connect up to four Acoustimass modules in four different rooms. *See, e.g.*,  
27 BOSE\_SUB-0000001-55 at 42. In this regard, I understand that each connected Acoustimass  
28 module can receive its own respective audio signal from a given one of the four audio outputs of  
the Multi-Room Interface. The Bose Lifestyle 50 Guide also discloses that the connected

1 Acoustimass modules can each play a different audio source or can “share” an audio source  
2 depending on the desired configuration and depending on the number of sources connected to the  
3 audio input connectors of the Multi-Room Interface. *Id.* at 43-44. The input and output connectors  
4 of the Multi-Room Interface are illustrated in the figure below:

5 **Figure 47**

6 ROOM jacks on the multi-room  
7 interface

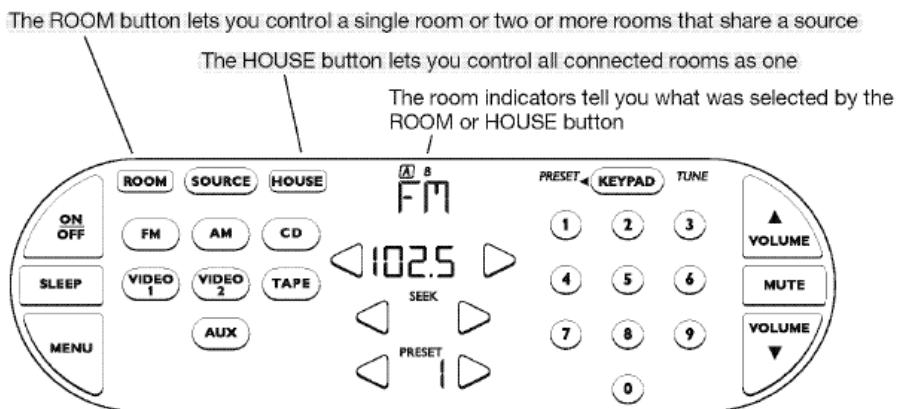


8  
9  
10 *Id.* at 42.

11  
12 354. To help facilitate control of the Bose Lifestyle 50 System, a “Personal music  
13 center” is provided. *Id.* at 43. The Personal Music Center is a portable handheld device with a  
14 touch-screen display that provides information about the Bose Lifestyle 50 System and enables a  
15 user to select audio sources and control playback of audio sources on Acoustimass modules in one  
16 or more rooms. *Id.* at 43-45. Below is a figure of the Personal Music Center from the Bose  
17 Lifestyle 50 Guide:

18 **Figure 48**

19 Example display for a two-room  
system



20  
21  
22  
23  
24 *Id.* at 320.

25  
26 355. In order to control the Bose Lifestyle 50 System, the Personal Music Center must  
27 “set up a radio frequency link” to establish communications with the centralized Multi-Room  
28 Interface. *Id.* at 19 (“When batteries are first installed in the Personal music center; it sets up a

1 radio-frequency link with the closest multi-room interface.... If the Personal music center  
2 continuously displays "NO RESPONSE," you need to try to establish its link with the multi-room  
3 interface again."), 45 ("To add a new Personal music center to your system, follow the setup  
4 instructions on page 17. Be sure to install the batteries and turn it on for the first time close to the  
5 multi-room interface to allow the new Personal music center to set up a radio frequency link with  
6 your system. If the multi-room interface is not plugged in or the Personal music center is out of  
7 range, the display indicates NO RESPONSE.").

8       356. The Personal Music Center and the "multi-room interface" communicate using a  
9 proprietary radio frequency communication protocol that was specifically developed for the Bose  
10 Lifestyle 50 System and that is "not compatible" with protocols used in other Bose systems. *See*  
11 BOSE\_SUB-0000663-683 at 666 ("The communication protocol used in the Lifestyle® 50 system  
12 is not compatible with the protocol currently used in other Lifestyle® systems.")

13       357. Notably, there is no disclosure in the Bose Lifestyle 50 Guide or any other evidence  
14 I have seen that the Personal Music Center can communicate with Acoustimass modules and/or  
15 Jewel Cube speakers using Bose's propriety communication protocol or otherwise. Instead, the  
16 evidence I have seen shows that Personal Music Center uses Bose's propriety communication  
17 protocol to communicate only with the Multi-Room Interface, which in turn distributes audio to  
18 the Acoustimass modules. *See* BOSE\_SUB-0000001-55 at 43 ("When batteries are first installed  
19 in the [Personal] music center; it sets up a radio-frequency link with the closest multi-room  
20 interface.").

21       358. The Bose Lifestyle 50 Guide also discloses that "[i]f two or more rooms are  
22 connected to [the Bose Lifestyle 50 System], the Personal Music Center displays ROOM and  
23 HOUSE buttons, and room indicators (A, B, C, and/or D)." *See* BOSE\_SUB-0000001-55 at 43.  
24 These ROOM and HOUSE buttons enable a user to configure the Multi-Room Interface to  
25 distribute audio from different audio sources to different rooms or to distribute the same audio  
26 from the same audio source to multiple rooms at the same time. Specifically, the Bose Lifestyle  
27 50 Guide discloses that "[t]he ROOM button allows you to select any connected room and control  
28 any sound source you want to hear in that room." *Id.* at 44. The Bose Lifestyle 50 Guide also

1 provides the following instructions for how to use the ROOM button to set up a “shared source”  
2 in multiple rooms:

3 **Setting up a shared source**

4 Now, let’s say the system is already on and you want to play the FM radio in rooms A and B:

- 5 1. Wake up the Personal music center.
- 6 2. Press the ROOM button until the room indicator **A** is displayed. Press the FM source  
button and adjust the volume to the desired level for room A.
- 7 3. Press the ROOM button again to select room **B**. Press the FM source button and adjust  
the volume to the desired level for room B. Now, the indicators **A B** are displayed.
- 8 4. Press the ROOM button again. The indicators **A B** appear on the display indicating that  
you can control these two rooms together. Any button command given now (SOURCE,  
9 VOLUME, MUTE, ON/OFF, SLEEP) is applied to both rooms.

10 *Id.*

11 359. The Bose Lifestyle 50 Guide discloses that the HOUSE button enables a user to  
12 “link all rooms together and control them as one,” such that “[a]ny button pressed after that (any  
13 source button, VOLUME, MUTE, or SLEEP) affects every room”:

15 **Using the HOUSE button**

16 Using the HOUSE button, you can link all rooms together and control them as one. When you  
17 press the HOUSE button, an empty box indicator is displayed for each connected room. Any  
18 button pressed after that (any source button, VOLUME, MUTE, or SLEEP) affects every room.  
When you are done listening you can press OFF to turn off the entire system.

- 19 ‘ **Note:** If you do not press any additional buttons after pressing HOUSE, pressing HOUSE  
again cancels HOUSE mode.

20 *Id.* at 45. In this way, a user can use the HOUSE button followed by a source button to set up a  
21 shared source for all rooms A-D in their home.

22 360. Notably, neither the Bose Lifestyle 50 Guide nor any of the other evidence I have  
23 reviewed discloses anything about what specific information is transmitted from the Personal  
24 Music Center to the Multi-Room Interface as a result of “link[ing]” rooms together and setting up  
25 a “shared source.” However, based on the evidence I have reviewed, it appears that no information  
26 would be sent from the Personal Music Center to the Multi-Room Interface until at least the user  
27 selects the source at which point the Personal Music Center would send some sort of information  
28 to the Multi-Room Interface to cause the Multi-Room Interface to configure itself to distribute

1 audio from the selected audio source to the selected room(s). *See, e.g.*, BOSE\_SUB-0000001-55  
2 at 6 (“The Bose multi-room interface, with four independent audio outputs that allow you to enjoy  
3 Bose sound throughout your home.”), 12 (illustrating a Bose Lifestyle 50 System configuration  
4 with a CD player and an Acoustimass module connected the Multi-Room Interface), 17  
5 (illustrating various audio sources connected to Multi-Room Interface via audio input cables), 19  
6 (“When batteries are first installed in the music center; it sets up a radio-frequency link with the  
7 closest multi-room interface.”), 44-45 (explaining how to use ROOM and HOUSE buttons to set  
8 up an audio source for one or more rooms).

9       361. Based on my review of the Bose Lifestyle 50 Guide, it is my opinion that the Bose  
10 Lifestyle 50 System is a type of conventional audio system with a centralized Multi-Room  
11 Interface that is hard-wired to one or more Acoustimass modules so that audio could be distributed  
12 from the centralized Multi-Room Interface to the “Acoustimass module(s)” and then to the wired  
13 Jewel cube Speakers. *See* BOSE\_SUB-0000001-55 at 11-12. A POSITA would not consider the  
14 Multi-Room Interface and the Acoustimass modules to be operating on a data network because the  
15 hard-wired connection described in the Bose Lifestyle 50 Guide is not a medium that interconnects  
16 devices, enabling them to send digital data packets to and receive digital data packets from each  
17 other. In contrast, the ’966 Patent is specifically directed to *networked* multimedia systems that  
18 operate on local and wide area *data networks*, which are distinctly different from conventional  
19 multimedia systems such as the Bose Lifestyle 50 System. *Compare* ’966 Patent at 4:39-5:15, Fig.  
20 1 *with* 1:46-2:16.

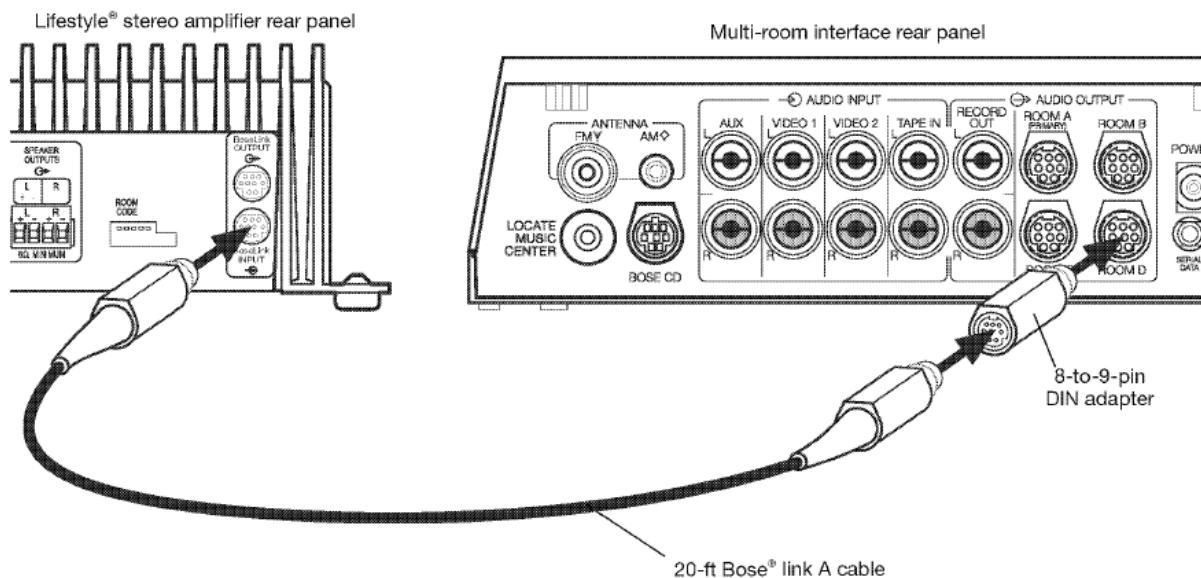
21       362. Likewise, applying Sonos’s constructions of “zone player” and “data network,”  
22 neither a Jewel Cube speaker, nor an Acoustimass module, nor an SA-2 or SA-3 amplifier is a  
23 “first zone player” because these devices (i) are not data network devices that can send digital data  
24 packets to and receive digital data packets from another device and (ii) are not capable of  
25 performing any digital data processing on the audio before outputting it. Instead, the evidence I  
26 have reviewed shows that a Jewel Cube speaker merely receives an audio signal over an audio  
27 cable from an Acoustimass module or SA-2 or SA-3 amplifier and outputs audio, and that an  
28 Acoustimass module or SA-2 or SA-3 amplifier receives an audio signal over an audio cable from

1 the Multi-Room Interface of the Bose Lifestyle 50 system and outputs audio. *See BOSE\_SUB-*  
2 0000001-55 at 7, 11-12, 14-15, 42; *BOSE\_SUB-0000361-448* at 376. There is no evidence of  
3 two-way digital data packet communication between a Jewel Cube speaker and an Acoustimass  
4 module or SA-2 or SA-3 amplifier, or between an Acoustimass module or SA-2 or SA-3 amplifier  
5 and the Multi-Room Interface of the Bose Lifestyle 50 system. There is also no evidence of any  
6 communication whatsoever between Jewel Cube speakers or between Acoustimass modules or  
7 SA-2 or SA-3 amplifiers when these products are used with a Multi-Room Interface of the Bose  
8 Lifestyle 50 system, as Dr. Schonfeld appears to be asserting. And lastly, there is no evidence that  
9 these devices perform any digital data processing before outputting the audio.

10                   **ii. Overview of the Bose Lifestyle SA-2 and SA-3 Stereo Amplifiers**

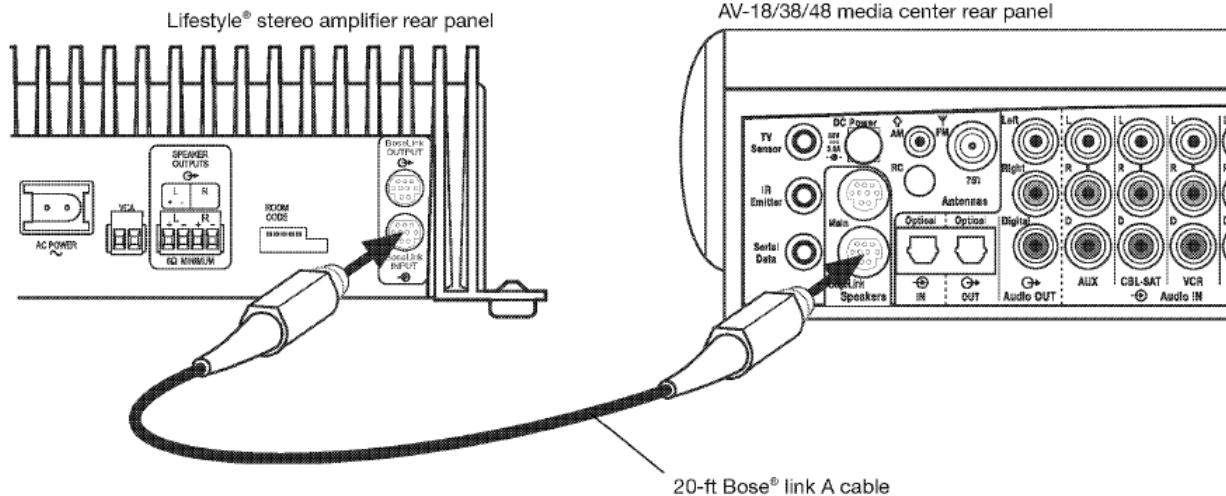
11         363. As described in “The Bose Lifestyle SA-2 and SA-3 Stereo Amplifier Owner’s  
12 Guide” (“SA-2 and SA-3 Owner’s Guide”), dated 2004, the Bose SA-2 and SA-3 stereo amplifiers  
13 can be used with certain Bose Lifestyle systems to “expand” such systems by adding non-powered  
14 speakers that can be connected to the SA-2 and SA-3 amplifiers via speaker wire. *See*  
15 *BOSE\_SUB-0000361-448* at 366-369, 376.

16         364. Although the Bose Lifestyle 50 System is not expressly referenced in the SA-2 and  
17 SA-3 Owner’s Guide, it does appear that SA-2 and SA-3 amplifiers can be connected to the Multi-  
18 Room Interface of a Bose Lifestyle 50 System, as shown in the following image:



1  
2 See BOSE\_SUB-0000361-448 at 376. However, as shown, unlike an SA-2 or SA-3 amplifier, the  
3 Multi-Room Interface of the Bose Lifestyle 50 System does not have a “Bose link” connector so  
4 an “8-to-9-pin DIN adapter must be used in order to connect an SA-2 or SA-3 amplifier to the  
5 Bose Lifestyle 50 System using the “Bose link A cable” that comes with the SA-2 or SA-3  
6 amplifier. In this regard, an SA-2 or SA-3 amplifier could be connected to the audio output  
7 connector for ROOM B, C, or D. *Id.* (“Insert the 8-to-9-pin adapter into one of the unused ROOM  
8 output connectors (B, C, or D) on the rear of the multi-room interface....”). Thereafter, I  
9 understand that the Personal Music Center could be used to control the SA-2 or SA-3 amplifier via  
10 Multi-Room Interface, as I explained above in connection with the Bose Lifestyle 50 System. *Id.*  
11 at 377. As one exemplary configuration, an Acoustimass module could be connected to the ROOM  
12 A output connector while an SA-2 or SA-3 amplifier could be connected to each of the ROOM B-  
13 D output connectors. In this arrangement, it appears that the SA-2/SA-3 amplifiers would operate  
14 in the Bose Lifestyle 50 system as if they were another Acoustimass module.

15 365. Alternatively, the SA-2 and SA-3 amplifiers can be connected to other newer Bose  
16 Lifestyle systems that do have a Bose link connector and in such a configuration no adapter is  
17 needed, as shown below:



27 *Id.* at 372.  
28

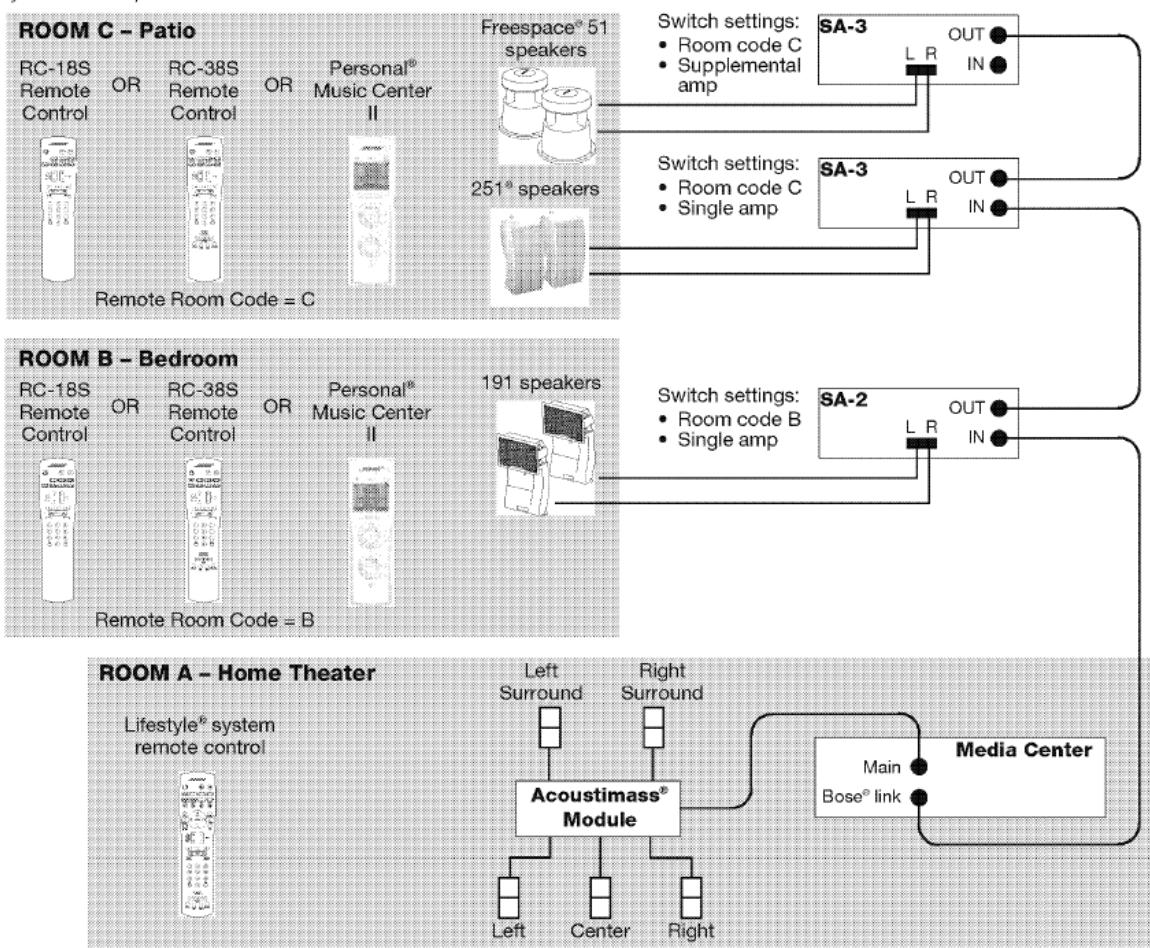
1       366. For these newer Bose Lifestyle systems, I understand that there is only a single  
2 Bose link connector on the centralized Bose link enabled media center and thus only a single SA-  
3 2 or SA-3 amplifier can be connected directly to the centralized media center for the Bose Lifestyle  
4 system. *Id.* Moreover, in such a configuration, “[f]or the Lifestyle® stereo amplifier to work  
5 properly with your home entertainment system, the expansion protocol menu item must be set to  
6 Bose® link.” *Id.* at 373.

7       367. As explained in the “Setup guidelines for additional rooms” section of the SA-2  
8 and SA-3 Owner’s Guide, if a user wishes to install one or more additional SA-2 or SA-3 amplifiers  
9 in other rooms of their home, this can be done through a series of Bose link connections, as shown  
10 below:

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1  
 2 **Figure 18**  
 3

4 Sample installation of  
 5 Lifestyle® stereo amplifiers  
 6



*Id.* at 384.

368. Notably, the “Setup guidelines for additional rooms” section of the SA-2 and SA-3 Owner’s Guide states that it only applies to “a Lifestyle® 18 series II, 28 series II, 38 or 48 home entertainment system” – not a Bose Lifestyle 50 System. *Id.* Additionally, the only compatible controllers shown for these “additional rooms” are the RC-18S, RC-38S, and Personal Music Center II – not the Personal Music Center that comes with the Bose Lifestyle 50 System. Moreover, in such a configuration with “additional rooms,” a separate remote must be dedicated to each room, which is done by setting the room switches on the remote control and the room switches on the SA-2 or SA-3 amplifier to match each other. *Id.* at 384-386 (“Remote controls for

1 other rooms must be set to the same house code as the main room remote, but each remote must  
2 be set to a different room code. ... The Lifestyle® amplifier and its remote control must be set to  
3 the same room code.”). In this regard, it is my understanding that, unlike the Personal Music  
4 Center of the Bose Lifestyle 50 System, which allowed for the control of multiple rooms connected  
5 to the Multi-Room Interface, the dedicated remote controls used with a Bose link configuration of  
6 “a Lifestyle® 18 series II, 28 series II, 38 or 48 home entertainment system” could only control a  
7 single room at a time.

8                   **iii. Overview of the Bose Link Communication Protocol**

9                   369. As described in the undated, internal Bose document titled “Understanding Bose  
10 link,” “Bose link is a communication protocol” and “[t]o communicate there must be at least two  
11 participants that speak the same language.” BOSE\_SUB-0000594-601 at 595. As also explained:  
12 “For a Bose link setup to work the system must include a Bose link enabled media center (a  
13 controller), a Bose link expansion product, and an expansion remote control. Both the expansion  
14 product and the remote must be configured to operate on the same room.” *Id.* It is my  
15 understanding that Bose’s SA-2 and SA-3 amplifiers are Bose link expansion products. *Id.* at 601;  
16 BOSE\_SUB-0000361-448 at 376. However, per the “Understanding Bose link” document, an SA-  
17 2 or SA-3 amplifier would only use the Bose link communication protocol if it was connected to  
18 a Bose link enabled media center and controlled by an expansion remote control.

19                   370. As also explained in the “Understanding Bose link” document, the Bose link  
20 communication protocol is only used to transmit certain types of information between Bose link  
21 enabled devices:

22                   A Bose link connection is essentially a conversation between the media center and  
23 the expansion device. The media center sends on/off, volume and source change  
24 commands along with audio to the expansion product. The expansion product  
25 responds by sending information back to the media center to let it know that it is  
26 still on (or off) and in the same room. This information exchange occurs each time  
27 a power or source change command is issued by the expansion remote.

28                   When the media center receives an ON command from an expansion remote the  
system turns on and checks for any Bose link products that might be connected, but

1 it will only look for Bose link products that are assigned to the same room as the  
2 remote.

3 If the media center receives a command from a remote configured for room B, for  
4 example, the media center calls out to other Bose link products which might be  
5 assigned to room B. If a connected expansion product is assigned to room B it will  
6 respond to the media center and a Bose link connection will be made. The media  
7 center will not acknowledge a response from anything not assigned to room B.

8 The media center will not acknowledge more than one response from the same  
9 room, either. As with any productive conversation, there can only be one person  
10 speaking at a time. If more than one product is assigned to room B the media center  
11 won't know which one to listen to. If the media center can't understand the response  
12 from the expansion products, or if there is no response at all, the media center will  
13 turn itself off and the Bose link connection will not be successful.

14 BOSE\_SUB-0000594-601 at 595-596. In this regard, I understand that if a user wanted to turn on  
15 multiple Bose link expansion products in different rooms of their home using the Bose link  
16 communication protocol, the user would have to press the power on button on a dedicated  
17 expansion remote control for each room, which would then cause the Bose link enabled media  
center to check for a Bose link enabled expansion product assigned to that room and, if one is  
found, a Bose link connection would be made. I have not seen any evidence that the Bose link  
communication protocol can be used to turn on multiple Bose link expansion products in different  
rooms via a single remote control.

18 371. Notably, there is no disclosure in the "Understanding Bose link" of a Bose  
19 expansion remote control transmitting information directly to a Bose link enabled expansion  
20 product. Instead, based on the materials I have reviewed, a Bose expansion remote control  
21 transmits information to a Bose link enabled media center, which in turn transmits information to  
22 a Bose link enabled expansion product. *See, e.g., BOSE\_SUB-0000594-601 at 595-597.*

23 372. The "Understanding Bose link" document also explains how "A Bose link enabled  
24 media center is also capable of managing two separate sources at the same time" using two  
25 different audio streams, namely, stream 1 and stream 2. *Id.* at 597. While "[t]he main room, or  
26 room A, can only operate on stream 1," "any of the expansion rooms can be configured to operate  
27 on either stream 1 or stream 2." *Id.* The following example is also provided:

1 If an expansion remote configured for stream 1 sends an ON command to the media  
2 center, the media center will activate the pins that carry stream 1 information. The  
3 media center will also call out to any Bose link product set to the same room code  
4 as the remote. If the media center gets an answer it can understand, it will respond  
by telling the expansion product to turn on and listen to its stream 1 inputs. If the  
media center does not get a response from an expansion product set to the same  
room as the remote it will simply turn itself off.

5 *Id.*

6 373. In this regard, I understand that the stream for each Bose link enabled expansion  
7 product is set at the dedicated expansion remote control for the room in which that expansion  
8 product is located. Accordingly, if a user wanted to listen to stream 1 in Room B, the user could  
9 set the dedicated Room B expansion remote to stream 1 and then use that dedicated Room B  
10 expansion remote to turn on the Bose link enabled expansion product in Room B and thereafter  
11 control playback of stream 1 on the Bose link enabled expansion product in Room B. To listen to  
12 that same stream 1 in a different room, such as Room C, the user could set the dedicated Room C  
13 expansion remote to stream 1 and then use that dedicated Room C expansion remote to turn on the  
14 Bose link enabled expansion product in Room B and thereafter control playback of stream 1 on  
15 the Bose link enabled expansion product in Room C.

16 374. Based on the materials I reviewed, it is my opinion that the Bose link  
17 communication protocol was not utilized by or compatible with the Bose Lifestyle 50 System,  
18 including the Multi-Room Interface and the Personal media center. My opinion is supported by  
19 the fact that the Bose Lifestyle 50 Guide is dated October 17, 2001 while the first reference I have  
20 seen to the Bose link communication protocol is in the 2004 SA-2 and SA-3 Owner's Guide. See  
21 BOSE\_SUB-0000361-448 at 368. In other words, the Bose link communication protocol appears  
22 to have been developed years after the Bose Lifestyle 50 System. Additionally, the  
23 "Understanding Bose link" document does not reference the Bose Lifestyle 50 System and vice  
24 versa.

25 375. My opinion that the Bose link communication protocol was not utilized by or  
26 compatible with the Bose Lifestyle 50 System is also supported by the fact that the "Setup  
27 guidelines for additional rooms" section of the SA-2 and SA-3 Owner's Guide describes how to  
28

1 use the Bose link technology to add up to 14 rooms to a Bose Lifestyle system, but the only Bose  
2 Lifestyle systems that are listed are the “Lifestyle® 18 series II, 28 series II, 38 or 48 home  
3 entertainment system[s]” – not a Bose Lifestyle 50 System. *See BOSE\_SUB-0000361-448 at 384;*  
4 *see also BOSE\_SUB-0000594-601 at 595 (explaining how the Bose link technology allows the*  
5 *addition of 14 rooms “B-O” using “Bose link expansion product[s]”). Additionally, the only*  
6 *compatible expansion remote controls shown for these “additional rooms” are the RC-18S, RC-*  
7 *38S, and Personal Music Center II – not the Personal Music Center that comes with the Bose*  
8 *Lifestyle 50 System. This makes sense because, unlike the Bose Lifestyle 50 System, which*  
9 *appears to have been developed in 2001 and discontinued in 2003 (see BOSE\_SUB-0000001-55;*  
10 **SONOS-SVG2-00226910**

11 ([https://www.bose.com/en\\_us/support/products/bose\\_home\\_theater\\_support/bose\\_5 Speaker\\_ho](https://www.bose.com/en_us/support/products/bose_home_theater_support/bose_5 Speaker_ho)  
12 [me\\_theater\\_support/l50.html](me_theater_support/l50.html))), the “Lifestyle® 18 series II, 28 series II, 38 or 48 home  
13 entertainment system[s]” appear to have all been developed in 2004 around the time that the Bose  
14 link communication protocol appears to have been developed (*see SONOS-SVG2-00226906*  
15 ([https://www.bose.com/en\\_us/support/products/bose\\_home\\_theater\\_support/bose\\_5 Speaker\\_ho](https://www.bose.com/en_us/support/products/bose_home_theater_support/bose_5 Speaker_ho)  
16 [me\\_theater\\_support/l518\\_series2.html](me_theater_support/l518_series2.html)); **SONOS-SVG2-00226907**

17 ([https://www.bose.com/en\\_us/support/products/bose\\_home\\_theater\\_support/bose\\_5 Speaker\\_ho](https://www.bose.com/en_us/support/products/bose_home_theater_support/bose_5 Speaker_ho)  
18 [me\\_theater\\_support/l528\\_series2.html](me_theater_support/l528_series2.html)); **SONOS-SVG2-00226908**

19 ([https://www.bose.com/en\\_us/support/products/bose\\_home\\_theater\\_support/bose\\_5 Speaker\\_ho](https://www.bose.com/en_us/support/products/bose_home_theater_support/bose_5 Speaker_ho)  
20 [me\\_theater\\_support/l538\\_series1.html](me_theater_support/l538_series1.html)); **SONOS-SVG2-00226909**

21 ([https://www.bose.com/en\\_us/support/products/bose\\_home\\_theater\\_support/bose\\_5 Speaker\\_ho](https://www.bose.com/en_us/support/products/bose_home_theater_support/bose_5 Speaker_ho)  
22 [me\\_theater\\_support/l548\\_series1.html](me_theater_support/l548_series1.html))).

23       376. My opinion that the Bose link communication protocol was not utilized by or  
24 compatible with the Bose Lifestyle 50 System is further supported by the fact that the Multi-Room  
25 Interface of the Bose Lifestyle 50 System does not have a Bose link connector and thus a special  
26 “8-to-9-pin DIN adapter” must be used to connect a Bose link expansion product like an SA-2 or  
27 SA-3 amplifier to the Multi-Room Interface of the Bose Lifestyle 50 System using a Bose link  
28 cable. In my opinion, when the “8-to-9-pin DIN adapter” is used to connect an SA-2 or SA-3

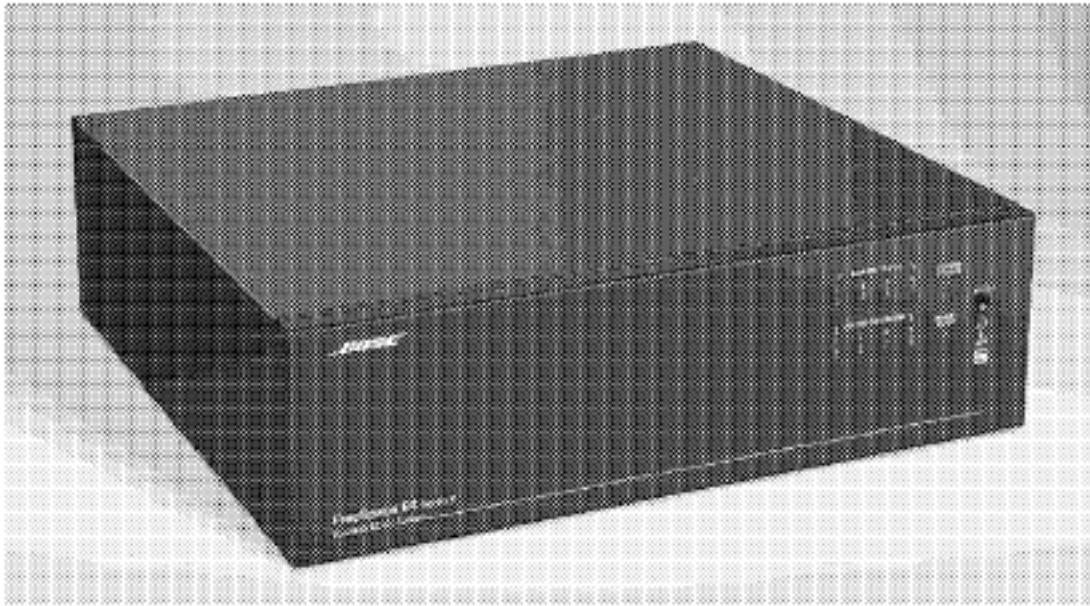
1 amplifier to the Multi-Room Interface, the SA-2 or SA-3 amplifier would not be able to  
2 communicate with the Multi-Room Interface using the Bose link communication protocol because  
3 I have seen no evidence that the Multi-Room Interface is a Bose link enabled media center.  
4 Instead, it is my opinion that the SA-2 or SA-3 amplifier would operate like the Acoustimass  
5 module of the Bose Lifestyle 50 System. Notably, I have not seen any evidence that the Multi-  
6 Room Interface of the Bose Lifestyle 50 System could be updated to operate in accordance the  
7 Bose link communication protocol.

8 377. My opinion that the Bose link communication protocol was not utilized by or  
9 compatible with the Bose Lifestyle 50 System is further supported by the fact that the Personal  
10 Music Center and the “multi-room interface” communicate using a proprietary radio frequency  
11 communication protocol that was specifically developed for the Bose Lifestyle 50 System and that  
12 is “not compatible” with protocols used in other Bose systems. See BOSE\_SUB-0000663-683 at  
13 666 (“The communication protocol used in the Lifestyle® 50 system is not compatible with the  
14 protocol currently used in other Lifestyle® systems.”).

15 **iv. Overview of the Bose FreeSpace E4 Series II Business Music  
16 System**

17 378. According to the “Bose FreeSpace E4 Series II Business Music System Owner’s  
18 Guide” (“Bose Freespace Owner’s Guide”) dated July 10, 2004, Bose FreeSpace “is an integrated  
19 four channel digital signal processor and 400-watt power amplifier for 70/1 DOV business music  
20 applications” that “provides all of the processing and control features required for one-to-four zone  
21 business music applications” in a “single chassis.” BOSE\_SUB-0000062-136 at 74. The Bose  
22 FreeSpace E4 product “allow[s] for an input source to be routed to any of the four amplifier  
23 outputs,” which allows for audio distribution for up to four different “zones.” *Id.* As shown and  
24 described in the Bose Freespace Owner’s Guide, “[s]peaker systems in up to four zones can be  
25 connected to the ZONE OUT amplifier outputs” using “the speaker cable from each zone.” *Id.* at  
26 93. I have not seen any evidence that the four individual “zones” can be combined and/or have  
27 any overlapping speaker systems. To the contrary, the Bose FreeSpace Guide indicates that up to  
28 four different speaker systems can be hardwired to the four different “zone” outputs on the

1 centralized Bose FreeSpace product thereby prohibiting any overlap. *Id.* A picture of the Bose  
2 FreeSpace E4 product is shown below:



13 *Id.* at 74.  
14

15 379. A Picture of the four "ZONE OUT outputs" as well as the "speaker cable" and  
16 "speaker cable connectors" utilized by the Bose FreeSpace E4 product is shown below:  
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## 4.7.9 Amplifier ZONE OUT outputs

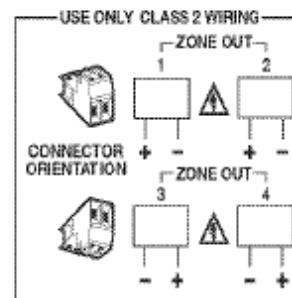
Speaker systems in up to four zones can be connected to the ZONE OUT amplifier outputs.



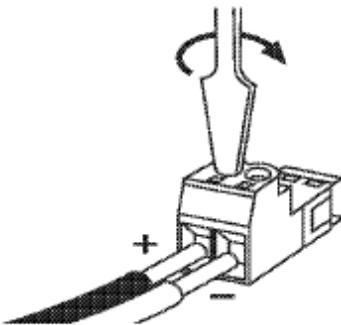
**Installer's Note:** Please notice the polarity markings on the ZONE OUT 1-4 connectors. Wire each connection as shown, using the 2-terminal output connector from the accessory kit.



**Installer's Note:** DO NOT ground the minus (-) side of the line.



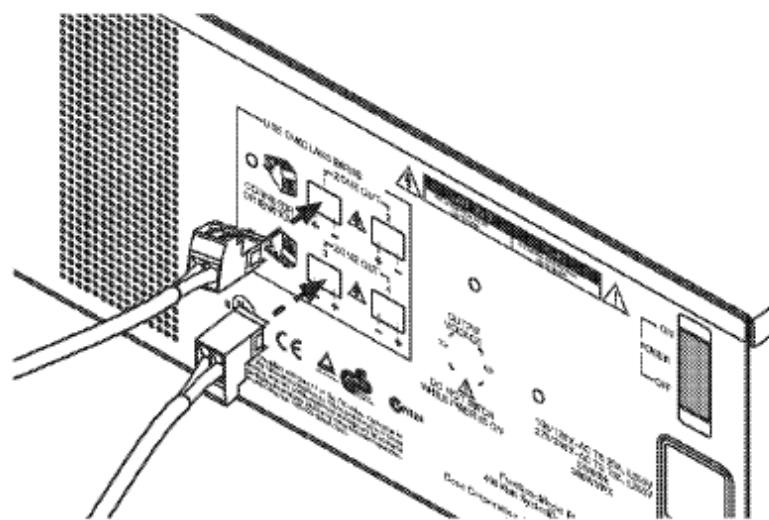
1. Install a two-terminal output connector (supplied) on the speaker cable from each zone.



2. Plug the speaker cable connectors into the appropriate ZONE OUT jack.

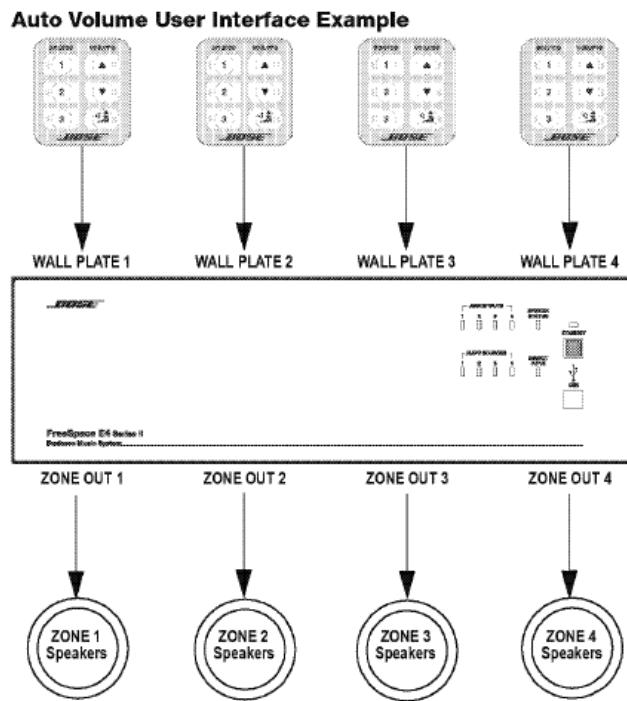


**Installer's Note:** Be sure to position the cable connector in the correct orientation for the ZONE OUT jacks: Screw heads face upward for ZONE OUT 1 and 2 jacks, screw heads face downward for ZONE OUT 3 and 4 jacks.



1 *Id.* at 93.

2 380. An example four “zone” configuration using the Bose FreeSpace E4 product is  
3 shown in the image below:

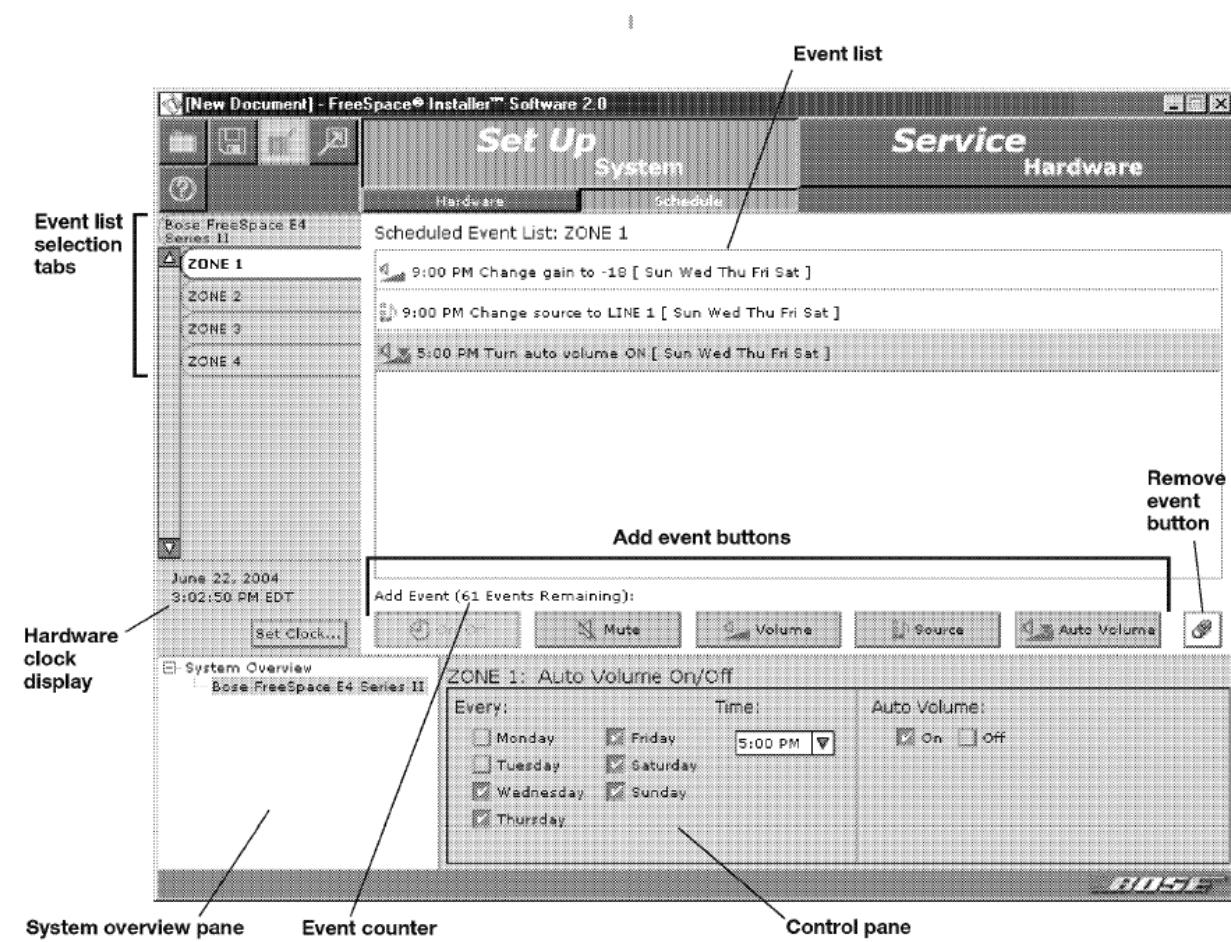


*Id.* at 121.

381. Based on this disclosure, it is my opinion that a system comprising the Bose FreeSpace E4 product connected to different passive speakers systems in different zones via speaker cable is a conventional centralized, hard-wired audio system such as that described in the Background section of the '966 Patent, where audio from audio sources connected to the centralized Bose FreeSpace E4 product is distributed to connected speaker systems. *See* '966 Patent at 1:46-2:16. A POSITA would not consider the centralized Bose FreeSpace E4 product and connected speaker systems to be operating on a data network because the hard-wired connection described in the Bose Freespace Owner's Guide is not a medium that interconnects devices, enabling them to send digital data packets to and receive digital data packets from each other. Moreover, as explained below, passive speakers like the ones that are hard-wired via speaker cable to the centralized Bose FreeSpace E4 product are not “zone players,” as required by the Asserted Claims of the '966 Patent, because they are not data network devices and are not

1 configured to process and output audio.

2       382. The Bose Freespace Owner's Guide also explains that a user can connect a  
3 computer to the Bose FreeSpace E4 product and use the "Set Up Schedule mode" on the  
4 "FreeSpace Installer Software" to "automate a system by creating up to 64 events." See  
5 BOSE\_SUB-0000062-136 at 101. "Events" can be set up for each of the four individual zones on  
6 the Bose FreeSpace E4 product and can include "events" such as "On/Off, Mute, Volume, Source,  
7 and Audio Volume." *Id.* I have not seen any evidence that an "event" can be set up for multiple  
8 zones. Rather, it appears that "events" are only be set up for a single zone, as shown in the image  
9 below where the list of "events" is specific to "ZONE 1":

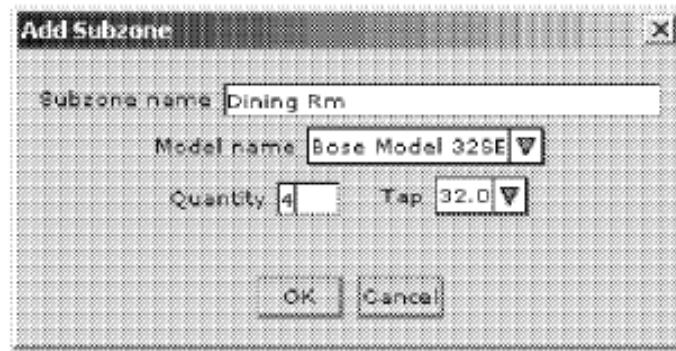
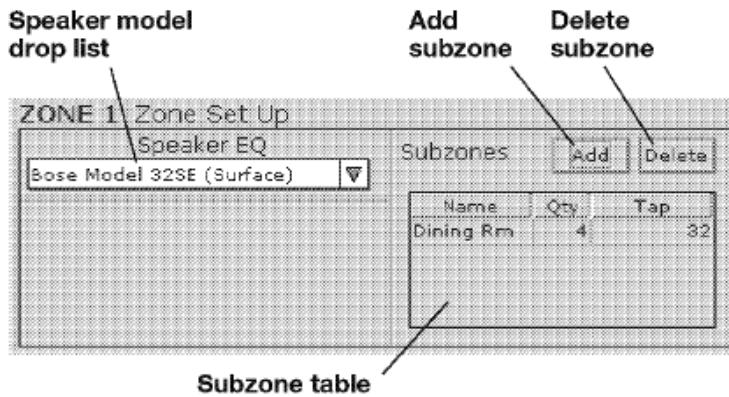


26 *Id.*

27       383. Such events "are only saved to the E4 unit" itself and there is no disclosure that

1 information about the events is transmitted to any other device such as a speaker system in a zone  
2 to which the event pertains. *Id.* at 103 (“Programmer’s Note: Events are only saved to the E4 unit  
3 when you click the ... Flash Hardware Configuration button.”). In other words, events are merely  
4 set up on the Bose FreeSpace E4 product and not communicated with any other device, and then  
5 audio is distributed from the centralized E4 Bose FreeSpace product to connected speaker systems  
6 in accordance with the events.

7 384. The Bose Freespace Owner’s Guide also discloses how that “The Zone Setup  
8 control panel allows you to select the EQ for the speakers used in a zone and to document (optional)  
9 the number of speakers in a subzone and their tap settings,” as shown in the images below:



24 *Id.* at 107-108

25 385. As explained, “[t]he Subzones table allows you to document the speakers used in a  
26 zone” and “select a tap setting” for those speakers, where a “zone is group of speakers that are  
27 driven by the same amplifier output channel” and “[a] subzone is a group of speakers within a zone

1 that use a common tap or are of a common type.” *Id.* at 108. “For example, you may have installed  
2 ten Model 16 speakers in a dining room and set it up as a zone to be driven by channel 1. In this  
3 zone you may have established two subzones, one with five Model 16 speakers tapped at 8W and  
4 the other with five tapped at 16W.” *Id.* In this regard, I understand that all speakers in a “zone”  
5 will play the same audio that the “zone” receives from the centralized Bose FreeSpace E4 product  
6 regardless of whether or not any “subzones” exist. I have seen no evidence that the “subzones”  
7 are a separate group of speakers that can play audio on their own separate and apart from the other  
8 speakers in the “zone.” Likewise, I have seen no evidence that an “event” can be set for just a  
9 “subzone.”

10       386. Moreover, I have not seen any evidence of anything other than audio being  
11 transmitted from the centralized Bose FreeSpace product to the connected speaker systems.

12       387. Further, I have not seen any evidence that the speaker systems that are connected  
13 to the centralized Bose FreeSpace E4 product can communicate with each other for any purpose.

14       388. In view of the above, a Bose FreeSpace system does not meet the “zone scenes”  
15 Requirements of the Asserted Claims of the ’966 Patent.

16       389. Notably, there is no disclosure in the Bose Freespace Owner’s Guide or any of the  
17 other Bose FreeSpace materials cited by Dr. Schonfeld teaching or suggesting that the Bose  
18 FreeSpace system is related to or somehow compatible with the Bose Lifestyle 50 System. To the  
19 contrary, based on the materials I have reviewed, it is my opinion that the Bose FreeSpace product  
20 and the Bose Lifestyle 50 System are not related or compatible. *See, e.g., BOSE\_SUB-0000663-*  
21 *683 at 666 (“The communication protocol used in the Lifestyle® 50 system is not compatible with*  
22 *the protocol currently used in other Lifestyle® systems.”).* Indeed, I have seen no evidence that a  
23 Bose FreeSpace product could somehow be connected to a Bose Lifestyle 50 System. Instead,  
24 the systems appear to be alternatives for distributing audio from a central location to one or more  
25 rooms or zones via an audio cable, albeit with very different capabilities, as described above.

26           **2. Dr. Schonfeld’s “Bose Lifestyle” Reference Does Not Qualify as Prior**  
27           **Art**

28       390. For the reasons explained below, it is my opinion that Dr. Schonfeld’s alleged Bose

1 the '966 Patent. The new functionality is also not commercially acceptable for the same reasons  
2 as already discussed.

3 To the extent Dr. Schonfeld expands on his opinions concerning NIA 1 or the new software  
4 update, I reserve my right to respond

5 **XVIII. DEMONSTRATIVES**

6 1656. To help assist in my testimony at trial, I have prepared a number of demonstratives  
7 that are attached hereto as **Exhibit 5**. These demonstratives are exemplary and I reserve the right  
8 to create additional demonstratives and/or to modify the demonstratives in **Exhibit 5** based on the  
9 material in this report. For example, I reserve the right to create additional demonstratives and/or  
10 to modify the demonstratives in **Exhibit 5** based on the images I included in this report as well as  
11 the evidence cited in this report. I also incorporate by reference the demonstratives I prepared for  
12 my opening report.

13 1657. I have also reviewed Sonos's Technology Tutorial that provides an overview of the  
14 '885 and '966 Patents, which I understand was submitted to the court in February 2022. I  
15 incorporate by reference herein Sonos's Technology Tutorial and expressly reserve the right to use  
16 the Technology Tutorial in whole or in part as a demonstrative to assist in my testimony.  
17 Additionally, I have attached a pdf version of Sonos's Technology Tutorial hereto as **Exhibit 6**  
18 and expressly reserve the right to use the images contained therein as demonstratives to assist in  
19 my testimony.

20 **XIX. RESERVATION OF RIGHT**

21 1658. I reserve the right to further expound on my rebuttal opinions, including the validity  
22 of the Asserted Claims of the '966 Patent, in subsequent declarations, reports, and/or at trial.

23  
24 Dated: January 13, 2023

25 By: \_\_\_\_\_  
26 Kevin C. Almeroth

27  
28